

# Clubfoot Treatment Guide for Parents



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ORTHO **Kids** CLINIC

Ahmedabad, India.

## **Dedication**

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I dedicate this book to Late Dr. Ignacio Ponseti (Iowa, USA), who invented this revolutionary treatment of clubfoot correction. Today, numerous children born with clubfoot are completely cured without any major surgery, by Ponseti plaster technique across the world. These children are able to live a normal productive life.

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## About the Author

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Dr. Maulin Shah received his degree in M.S. Orthopedics in the year 2003 from L.G. Hospital and V.S Hospital, Ahmedabad with a Gold Medal. During his training, the subject of his research was " non-surgical management of Clubfoot". He presented his research before the world famous Dr. Shafique Pirani from Canada in the year 2002. During their discussion, Dr. Pirani mentioned about the Ponseti Technique of clubfoot treatment and since then it ignited an interest in Dr. Shah to know more about this technique.

In the year 2005, Dr. Shah completed his fellowship in Pediatric Orthopedics under the luminous guidance of renowned Pediatric Orthopedic Surgeon Dr. Ashok Johari from Mumbai. After this basic training, he got an opportunity to work at Iowa Children's Hospital , USA in year 2006 with the world renowned Dr. Igancio Ponseti. He gained in depth knowledge about the technique from the master himself. In the year 2008-2009, he completed advanced fellowship in Pediatric Orthopedics from prestigious Hospital for Sick





Children, Toronto, CANADA.

Since the year 2009, after starting Orthokids Clinic at Ahmedabad, he has been involved in the treatment of more than 2000 children with clubfoot. Today he is regarded as one of the most experienced surgeons in the management of clubfoot in INDIA.



With Dr. Shafique Pirani  
At L.G. Hospital,  
Ahmedabad, India - 2003.



With Dr. Ponseti at Iowa  
Children's Hospital, Iowa,  
USA - 2006.



## Introduction

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Dear Parents,

It is a very distressing moment for the parents and the family members, when a child is born with clubfoot. In most of the instances, the parents have never come across a deformity like this, hence it makes them anxious and frustrated. Parents are surrounded by multitude of questions like whether our child's deformity would be completely corrected, whether he will be able to play and run like a normal child, whether he will need big surgeries to correct the deformity and when is the right time to start the treatment. Parents might get more confused after receiving multiple advises from the surrounding people.

At Orthokids Clinic, in the last 15 years, we had the opportunity to get involved in the treatment of more than 2000 children through Ponseti Technique. During this time, we have tried to answer all the queries and questions raised by families. A thought occurred in our minds, if we can answer all these confusing questions at the beginning of the clubfoot treatment, it can immensely help the worried



families. We approached the parents of clubfoot children who received treatment at Orthokids Clinic and inquired the common questions generated at different stages of treatment. We have classified all these questions appropriately and tried to answer them in a lucid way.

I hope that this information booklet will provide all the answers that the parents have been looking for and help them through their treatment journey. At the end of this book, we have included experiences of some of the parents. I am sure that after reading these feedbacks, the parents will become more confident regarding this treatment.



Best Wishes.

**Dr. Maulin Shah**

Consultant Pediatric Orthopedic Surgeon,  
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## Acknowledgements

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At the outset, I would like to thank my parents and my family members who inspired me to pursue medicine as my career. Words of gratitude fall short for my wife Dr. Shalmi Mehta, who encouraged me to venture in the field of Pediatric Orthopedics. I am indebted to my children Saumya & Smayan, who have always welcomed me with a smile despite of my inability to spend quality time with them occasionally.

I am also grateful to Miss Vidhi Doshi, secretary of Orthokids Clinic who has helped in editing and typing the Gujarati version of this book. Along with this, i am thankful to Mr. Chandresh Patel (Speed Print) for designing and editing the text. I express my gratitude towards my father-in-law CA Bharat Mehta and my brother Mr. Kinnar Shah who have encouraged me to publish this guide and were happy to proofread it too. I appreciate the efforts of my fellows; Dr. Chinmay Sangole, Dr. Shalin Shah, Dr. Gaurav Gupta and Dr. Qaisur Rabbi for helping me translate this book in different languages. The continuous support from Shri Pravinbhai Modi



(Bonny Orthotech) and his team over the last 20 years is praiseworthy.

At the end, i thank from the bottom of my heart to the numerous Orthokids parents who invested their faith in me and handed over their beloved ones for the treatment.

I hope this book reaches all the concerned parents across the globe!

**Dr. Maulin Shah**



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# 1

## Diagnosis of Clubfoot in Antenatal Scan

### Question 1: What is "Clubfoot"?



**Answer 1:** The bottom of a golf stick is known as "Club". When the foot of a newborn is turned in at 90° from the leg segment, it resembles the shape of a club and hence it is termed as "Clubfoot".

### Question 2 : My antenatal scan at 20 weeks of pregnancy shows that our child has clubfoot deformity. How reliable is this sonography report?

**Answer 2:** Approximately 20% antenatal report of the clubfoot may be "False Positive". This means that, the foot may assume the posture of clubfoot within the uterus, but at the time of birth they are completely correctable. These 20% of children do not need any kind of treatment, however the rest 80% of children need to be treated.





**Question 3: Can we decide the degree of severity of clubfoot, based on this antenatal scan?**

**Answer 3:** No, this report explains only the shape and position of the foot. But this cannot explain whether the deformity is flexible or stiff (rigid).

**Question 4 : What is the difference between a “simple (idiopathic)” and a “Syndromic” clubfoot. Can we differentiate it on the antenatal scan? Based on the report of the scan, is it advisable to continue the pregnancy?**

**Answer 4:** If your fetus has an isolated (simple/ idiopathic) clubfoot deformity, this can be completely corrected by serial plasters applied through Ponseti technique. These children can lead a normal life. Hence the pregnancy should be continued. It is necessary to do detailed fetal anomaly sonography to detect fetal structural defects involving the spinal cord, spinal column, brain or other muscles/joints. It is also necessary





to rule out possible genetic causes of club foot by doing fetal genetic testing. If they find either genetic malformation or structural defect along with clubfoot, it is termed as a syndromic clubfoot.

Fetal medicine expert can help the family in identifying this condition. If there is a possibility of association of multiple deformities which can make the child's care difficult in future, the couple can take decision along with the guidance of Obstetric colleagues to decide about the continuation or possible termination of the pregnancy. Let me remind you again that for a simple (idiopathic) clubfoot, we advise parents not to terminate pregnancy because we can treat them completely with minimal surgical intervention.

**Question 5 : Will my child be able to walk in the future? Will my child be able to perform all the activities like a normal child?**

**Answer 5 :** After the treatment of the simple clubfoot, the children can live a normal life just like the other kids. They achieve developmental milestones within normal time frame. They can participate in all the sports activities.



**Question 6: How early we should approach the doctor once the child is born?**

**Answer 6:** The clubfoot deformity can get corrected earlier, if the treatment is started immediately after the birth. It has been observed that if the plaster treatment is started within the first month of life, it takes only 4-5 plasters to completely straighten the feet. I always advise parents that the treatment should be initiated as soon as the mother becomes comfortable after childbirth. Ideally, for a child born through normal delivery, the treatment can be started at the end of first week. While for the babies born through C-section, it is advisable to start treatment at the end of second week.





## The child born with Clubfoot

### **Question 1 : What is the reason for a child to be born with clubfoot?**

**Answer 1 :** So far, medical fraternity has not been able to identify the exact cause of why a child is born with clubfoot. However, some recent research suggests that "genetic factors" are responsible for this deformity to happen. Certainly, clubfoot is not related to Mother or Father's physical structure.

### **Question 2 : Would my child's feet get completely straightened after the plaster treatment ? Whether he will require any major operation for it?**

**Answer 2:** Most of the children's feet get completely corrected after serial plaster application through Ponseti technique. It does not require any major operation to correct the deformity. About 70-80% children might require a minor tenotomy procedure during the last plaster. (chapter -4)

### **Question 3 : What is " Ponseti Technique" of clubfoot correction?**





Clubfeet which were treated with Ponseti Technique.

Position of plasters during gradual correction of the deformity.

**Answer 3 :** Application of corrective plasters to gradually straighten the clubfoot is known as "Ponseti Technique". This method was pioneered by Dr. Ignacio Ponseti from Iowa, USA. Once the foot is corrected, child has to wear boots and bar. Parents are advised to carry out certain exercises to keep feet supple. Thus, brace wear and regular exercise after plaster treatment are also integral part of Ponseti Technique.

**Question 4 : When should we initiate the treatment of our child born with clubfoot?**

**Answer 4 :** It is advisable to start the treatment of clubfoot as soon as possible. It should be started within the first week of life for the babies who have born through normal delivery. Whereas, in the babies delivered through C-section, treatment can be started at the end of two weeks. It has been observed that if the



treatment is initiated in the first month of life, the deformity gets corrected quickly as the bones are soft and malleable. With further delay in the treatment, it requires more numbers of plasters to correct the deformity. When the child is more than 6 months old, anaesthesia may be required for the plaster application.

**Question 5 : Will my child experience the pain while applying the plaster?**

**Answer 5 :** The foot is very gently stretched before the plaster application. Due care is taken about the soft skin and the underlying tissue while applying plaster. Thus, children do not experience pain while undergoing Ponseti plaster treatment and they do not require any pain medication either.

**Question 6 : How much time it takes for complete correction of foot?**

**Answer 6 :** Usually, it takes four to five plasters to correct the deformity. These plasters are applied at weekly interval. The last plaster needs to be continued for 3 weeks, when a tenotomy is performed (Chapter-4). Thus, it takes approximately 7 to 8 weeks for the complete correction of the foot. Children are prescribed brace thereafter (Chapter -5).



**Question 7 : Does the child require sedation or anaesthesia for plaster treatment?**

**Answer 7 :** No, it requires only gentle stretching before every plaster application. This stretching is for few seconds and is painless. Thus, child does not need sedation or anaesthesia for plaster treatment. The tenotomy procedure during the last plaster is done after injection of 0.5 ml of local anaesthetic. Thus, children presented well in time never require a general anaesthesia during Ponseti plaster treatment.

**Question 8 : Will my child have any residual deformity after Ponseti plaster treatment?**

Minor difference in the size of calf can be observed in a clubfoot patient which was treated before 15 years.

**Answer 8 :** If the clubfoot treatment is started well in time i.e. within first few months of life, the deformity gets completely corrected. These children do not face any difficulty in walking, running and recreational activities.



Children with clubfoot in only one side can have minor difference in the size of foot and calf when compared to the normal side. Some children may also have minor difference in length of the leg, but it never requires surgery to correct them. A few parents have noticed that the child with unilateral clubfoot may require different size of shoe in both legs. Other than these issues, children do not have any permanent residual deformities after clubfoot treatment.

**Question 9 : Will our child need any other operation on foot in the future, after Ponseti plaster treatment ?**

**Answer 9 :** The rate of success of Ponseti treatment is reported to be 90-95% across the world. The rest of 5-10% children may experience a recurrence or relapse of clubfoot deformity. Most of the children with relapse are treated with a re-plaster application. Some children with hyperactive Tibialis Anterior Tendon and a resultant Dynamic supination deformity would require Tibialis Anterior Tendon transfer procedure (Chapter-8). Out of 2000 clubfeet which have been treated at Orthokids, about 4-5% children required to undergo this procedure. The main aim of the timely treatment is to avoid any neglected clubfoot deformities in the community. We follow a dictum at Orthokids Clinic:



**"EARLIER THE PRESENTATION  
EARLIER THE CORRECTION".**

**Question 10 : What are the chances that the subsequent child can have a clubfoot, if the elder sibling has clubfoot?**

**Answer 10 :** According to a research, the possibility of the subsequent child to have clubfoot is 15%. It is not necessary that the severity of the deformity will be the same as in the elder sibling.





### 3

## Ponseti method of plaster treatment

**Question 1 : Why is the plaster applied above-the-knee joint? Can it be applied below-the-knee ?**

**Answer 1 :** When the plaster is applied below-the-knee, there is a risk that it may slip off due to excessive movements of the legs. In addition, the Ponseti method involves turning the foot outwards during plaster application. In order to maintain this position, it is necessary to apply the plaster above the knee. When the plaster is limited to below-the-knee position, the child tends to turn the foot inwards along with the plaster and the deformity may not be completely corrected.

**Question 2 : What precautions should be taken by us after the plaster is applied?**



**Answer 2:** It is important to make the baby wear a diaper continuously to prevent the seepage of urine in to the



plaster. If the top of the plaster gets wet by urine, the surrounding skin may become red due to acidic nature of urine. Parents should also learn proper diaper care to prevent diaper rash. Detail information about the diaper care will be provided to you by the nurses at Orthokids clinic. It is also crucial to check baby's toes periodically to look for any swelling or discoloration.



This newborn received his first corrective plaster just 8 hours after the birth.  
If we start treatment early, the feet can get corrected early.

### **Question 3: How is the plaster removed? Do we have to remove the plaster at home?**

**Answer 3:** The plaster should not be removed at home. If it is removed at home, by the time the child reaches the hospital the foot might turn inwards again. On the day of the plaster change, at least two - three hours before the hospital visit, the baby's feet should be dipped in warm water for ten minutes. Then a wet cloth should be wrapped around the plaster so that by the time you reach to the hospital, the plaster becomes loose and can



be easily removed.

**Question 4: Does the plaster have any ill-effect on the baby's skin?**

**Answer 4 :** No, before applying the plaster, a machined softroll i.e. very soft cotton is rolled over the child's feet and the plaster is applied very carefully so that there is no pressure on the skin or the bones underneath. After the plaster comes off, the skin becomes perfectly normal so there is no need to worry about it.

**Question 5 : Will my child's legs become thinner due to plaster application?**

**Answer 5 :** When the leg is inside the plaster, usually the movement of the leg muscles is reduced and at the beginning the baby's legs may seem to be thin. But after the plaster is taken off, its constant movement restores its original shape and size. There is no weakness in the baby's muscles when the plaster is applied for such a short time.

**Question 6 : Can a child cry constantly due to the weight of the plaster ? Can he become irritable for not being able to move the legs?**

**Answer 6 :** There can be many reasons for a newborn baby to cry. But usually it is not because of the weight of the plaster or the lack of movement of the legs.



**Question 7: Which material is used for plastering?**

**Answer 7:** The plaster bandages are mainly made up of 'Plaster of Paris'. They can be easily moulded and are also easy to remove. Synthetic plaster material like fibreglass can also be used.

**Question 8 : If a child has clubfoot on one side, will there be any difference in the size of his foot in the future?**

**Answer 8 :** When a child is born with clubfoot on only one side, the number of muscle cells formed below the knee i.e. in calf and foot is relatively less compared to the normal side. For this reason, there may be a difference in the circumference of the calf and the size of the foot. Despite this difference, there will be no limitation in the child's movements or his ability to play. Sometimes the children with bilateral clubfeet might have varied severity in both sides. The more severely affected side may remain shorter than the milder side. This length difference does not prevent children from carrying out activities of daily living or recreational activities.





## Tenotomy performed during the last plaster

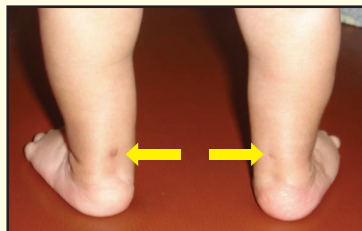
### Question 1: What is the meaning of "tenotomy"?

**Answer 1:** In children with clubfoot deformity, the cordlike structure behind the heel (which is also known as Tendo-Achillis / heel cord ) is usually very tight. As this muscle is short, it may keep the baby's heel elevated after initial correction. In about 80% of children, after the initial plasters are completed, this tight tendon needs to be lengthened and this small surgical procedure is termed as 'Tenotomy'.

### Question 2: How many babies need a Tenotomy?

**Answer 2:** Of the more than 2,000 children treated at OrthoKids clinic, we have found that about 80% of the children needed a Tenotomy. In 20% of children, when the foot could be raised as high as 15 degrees after the initial 3 to 4 plasters, the Tenotomy was not required. We have also found out through research that when the clubfoot treatment is started within first two weeks of life, the percentage of babies who require tenotomy is significantly reduced. Conversely, tenotomy is almost always required when the treatment is delayed for a few months after birth.



**Question 3 : How is the Tenotomy performed?**

Tenotomy scars

**Answer 3 :** Tenotomy procedure is done under local anaesthesia. General anaesthesia or sedation is usually not required. This is done by injecting about 0.5ml of local anaesthetic, 1 to 1.5cm above the heel. This injection is given in the same way as a baby is vaccinated. This makes the local area numb and child does not have pain. After this, the heel cord is loosened with a very small knife. The incision placed for tenotomy is so small that there is no need to take any stitches. This is an OPD based procedure and child does not need admission. After the Tenotomy, an above the knee plaster is applied like earlier plasters. The duration of this last plaster is 3 weeks. After 3 weeks the plaster is removed and the child is given a brace (chapter -5).

**Question 4 : After the heel cord lengthening, does the muscle become weak and does it pose any problem for child in future?**

**Answer 4 :** No, after the heel cord is lengthened, it gains its structural properties back in a lengthened position in 3



weeks' time. After the tenotomy, there is no change in the strength of the muscle behind the heel and this has been proven by various research.

**Question 5 : What care parents have to take at home after the tenotomy procedure?**



Occasionally after tenotomy, a small blood stain can be seen just above the heel.

**Answer 5 :** Generally, the care after the tenotomy procedure and final plaster is not different than the earlier plasters. Sometimes a small blood stain can appear on the plaster just above the heel. This is due to minor oozing of blood from the tenotomy wound. If this stain is progressing larger, we advise parents to draw a circle around it and send a photograph to us. They are suggested to send such photographs at hourly interval. In most instances, this stain stops enlarging in a couple of hours and it turns maroon in colour. Which suggests that the oozing has stopped.



**Question 6: Does the child have pain after the Tenotomy or does he need any antibiotics or pain medication?**

**Answer 6 :** Usually the child does not feel pain due to application of the local anesthesia before the tenotomy. At Orthokids, we usually do not prescribe pain medication or antibiotics after the tenotomy.





**5****Bracing (Splinting) after clubfoot plaster correction**

**Question 1: Why is there a need for a brace after straightening the leg with Ponseti method?**



**Answer 1 :** As mentioned earlier, clubfoot is a genetic problem. These children exhibit a genetic memory, which leads to a tendency of the foot to return to its original deformed shape. Wearing splints keeps the baby's legs in the corrected position for a long time. And after some time, that genetic memory is exhausted. Hence it is very important to wear splints. According to many research papers, 50 to 60% of children who do not wear splints regularly carry a risk of redeveloping the clubfoot deformities, which we call 'Clubfoot Recurrence'.

**Question 2 : What is a clubfoot Brace (splint) ?**

**Answer 2 :** Clubfoot Brace is commonly known as boots and bar. It has two shoe pieces. The two shoe pieces are



held at a certain angle and joined together with a bar. The purpose of this bar is to keep the foot constantly in the desired position. Some children have clubfoot deformity only on one side, but splints are worn on both legs. It is due to the difficulty in maintaining the necessary angle with a unilateral splint.

### **Question 3 : Can a child wear separate splints in both legs?**

**Answer 3 :** As mentioned above, it is difficult to maintain the desired angle of foot within the brace if it is worn separately and not attached with a bar. According to a research, the children wearing independent above the knee splints have more than 50% chance of clubfoot deformity recurrence. Thus, it is important for clubfoot children to wear boots and bar irrespective of whether it is a unilateral or a bilateral clubfoot.

### **Question 4 : How many hours a day the brace should be worn by the child?**

**Answer 4 :** For the first month and a half after the plaster is removed, the brace should be worn full time. It can be removed during the time when the baby is nursing, bath time and while doing exercises. The time to wear the brace is then gradually reduced. Usually 2-3 hours of splint free time is allowed every two months. The brace is to be worn at night and nape time once the child turns one year old. After 15 months, only night time bracing is



advised. Researchers have observed that, if this night time brace protocol is regularly followed till the age of 4 years, the rate of deformity recurrence goes as low as 5%. It is very rare to see recurrence after 4 years of age, and hence there is global recommendation to wear braces till the age of 4 years.

### **Question 5: What precautions parents should take while applying the brace?**

**Answer 5:** The most important thing while applying the brace is to make sure that the heel of foot is fitting well in the brace. This can be observed through a small window given on the side of the shoe piece. The central strap should be fastened first. The upper and lower straps should be lightly tied. If the child develops allergic reaction to the shoe piece liners, the thin cotton socks can be worn before putting the brace on.

### **Question 6 : How do the parents know if the brace size is turning small?**



**The signs which will indicate the splint is short .**

- A** Marks of straps over skin
- B** The distance between two feet is smaller than shoulder width.
- C** Toes outgrowing the splint



**Answer 6 :** Few signs can help parents know that the brace is small for the baby. When the baby's toes begin to protrude from the shoe piece, it should be understood that the splint is getting smaller. Excessive pressure marks of the brace straps are also indicator of increased foot size. The distance between the shoe pieces should be one inch larger than the shoulder width. Child may become irritable due to the perineal crowding when the bar distance is not adjusted according to the shoulder width.

**Question 7: What to do if my child cries while wearing a brace and insists on removing it?**

**Answer 7:** There are two main reasons why a child may not like to wear a brace. The first reason is the small size of the brace and the other one is if the deformity has started recurring. You can consult a doctor immediately when such a situation arises and if the splint is small it must be replaced to a larger size. If the deformity is relapsing, it should be immediately corrected with more regular exercises or correction by reapplying plasters. The issue of non compliance of the child with brace protocols should be addressed immediately, as 50-60% of non-compliant children can have deformity recurrence.

**Question 8: How often one needs to change the brace?**



**Answer 8 :** Children grow rapidly during first one & a half years of life. During this time, the braces need to be changed every four to five months. For next couple of years, children need brace change every six monthly. Thus, as the child's age advances the need to change the brace reduces.

**Question 9 : How to increase the compliance for brace wear? Or how to reduce the dislike?**

**Answer 9 :** Occasionally it is observed that, even with the adequate brace size and well corrected deformity, children may develop a dislike towards the brace. Different parents have tried novel ways to handle these issues. Some parents reward the child if he wears the brace and it helps to maintain the child's compliance. Some parents apply splints to the child's favourite soft-toys and that encourages the child to wear the brace. It is important to find out the reason of non-compliance immediately and resolve it.

**Question 10 : Will my child's motor development get delayed due to long time brace wear in the first year of life?**

**Answer 10 :** No, in children treated through Ponseti Technique, we have observed that the developmental milestones are achieved at the same time as compared to other normal children. In one case of clubfoot in twin



pregnancy, we observed that the child with clubfeet started walking earlier than the other sibling. However, the children with syndromic clubfeet and the those with hyperlaxity may show some delay in independent walking. Indian children usually walk independently between nine months to eighteen months. Children with clubfeet treated at Orthokids are not different.

**Question 11: What should we do if the child opens the brace by his own?**

**Answer 11:** After the age of 2 years, some children learn to take off the brace. We have suggested double velcro belt for them, which makes it difficult for them to remove. Buttons can also be applied at the end of straps so that the child cannot open it.

**Question 12: We have learnt about different brace designs. Are these braces better than the ones given at Orthokids?**

**Answer 12:** In clubfoot treatment, child's compliance is more important than the design of a brace. There are some new designs of brace available which allow the child to crawl. To allow such a movement, hinges are added on both the sides. We have observed that when we add more junctions in the brace, it has more wear and tear and thus needs more maintenance. The incidence of recurrence of the clubfoot deformity after wearing the



brace designed at Orthokids has been the same as reported worldwide. We offer other designs to parents if the child's compliance is compromised.

**Question 13: Can we apply anklet, ornaments or threads to our child's feet?**



Child should not wear ornaments or threads while the brace is on.

**Answer 13:** The ornaments or black threads should not be worn when a child is wearing a clubfoot brace. Often, these threads may create constriction at the lower leg and risk the circulation in the foot.





## Importance of regular exercise after Clubfoot Treatment

**Question 1: How to carry out exercise after clubfoot treatment and how frequently it is required?**



**Answer 1:** At the end of the plaster treatment, the treating doctor or his assistant will inform you about how to carry out gentle stretching exercise on foot. You will also be given a video about this (Chapter -11). This exercise keeps the baby's feet very flexible and also reduces the chance of clubfoot recurrence. Moreover, in case of an unusual recurrence of the deformity, parents who are regularly doing this exercise will be able to detect it much earlier and they can seek urgent attention of the treating doctor. This exercise should be done five times a day. Mothers are advised to carry it out before every feed in day time.

**Question 2: What should I do if my child cries during exercise or he is not allowing me to do exercise?**





**Answer 2:** Often, children express their dislike for exercise. There are different ways parents can try to increase child's compliance. Keeping child busy with storybooks, toys of their choice or watching their favourite show on television / mobile would facilitate the exercises. Few parents prefer to carry out exercise while reading stories to children or while the baby is asleep. It is very important to ensure that the exercise schedule and brace compliance is maintained. One of the reasons why child dislikes exercise might be a deformity recurrence. Sometimes, when a child cries too much during exercise, there is a possibility that the muscles may have stretched. In such cases, exercise should be stopped for a day or two or carried out gently.

**Question 3: What should be done if the routine vaccination schedule coincides with a child's plaster treatment?**

**Answer 3:** Usually the first dose of the vaccine is given immediately after birth. The second dose of vaccine is scheduled between 6 to 8 weeks of life. Clubfoot treatment started within first two weeks usually gets over by the end of the second month. Thus, under the guidance of the Pediatrician child's vaccination can be delayed for a week or two. Since the clubfoot plaster is extending up to groin, it might become difficult to administer the vaccine in the thigh while plaster is on.





## Recurrence of the deformity in clubfoot treatment

### **Question 1: What is the meaning of recurrence of deformity in clubfoot treatment?**

**Answer 1:** Even after complete resolution of the deformity after the plaster treatment, some children exhibit the deformity elements coming back. The foot might turn inward again or heel may go up. This is termed as "Recurrence of the deformity". It is described that the muscles below the knee joint carries a genetic memory to bring the deformity back.

### **Question 2: What is the main reason for the recurrence of the clubfoot deformity?**

**Answer 2:** It is described that the muscles below the knee joint carries a genetic memory to bring the deformity back. Regular exercises and brace wear help in breaking this memory. Irregularities in brace wear and non-compliance with exercises are the two main reasons for "recurrence". Many parents pay less attention to these schedules once the child starts walking. It is to be remembered that the clubfoot treatment is not finished when the child starts walking.

### **Question 3: How do we know that clubfoot is recurring**



**in our child?**

**Answer 3:** After clubfoot treatment with the Ponseti technique, parents are given appointment for regular follow up. The follow up time is usually at every three months for the first year of life. In the second and third years of life, we prefer to see the child every 4 months. Gradually the frequency of examination is reduced. It is important to see the children annually till their skeletal maturity to assess the flexibility of foot during growth spurts. During these follow ups, we check the range of motion in the foot joints and any reduction in range is taken very seriously. We advise parents to do more frequent exercises and to remain compliant with bracing protocols. Often, alert parents draw our attention about this reduced range of motion in child's foot. Early identification of recurrence is important to treat them with minimal intervention.

**Question 4: What treatment should be given if our child has clubfoot recurrence?**

**Answer 4:** The treating doctor should be immediately consulted if the clubfoot deformity has recurred. In most instances, the recurred deformity gets corrected again with proper and regular exercise protocols and regular splinting. In some children, we take the help of physiotherapist colleagues. Some children may need a repeat plaster treatment, if the deformity fails to get



corrected with above measures. When the child's age is beyond 6 months, we prefer to give plaster under short general anaesthesia.

**Question 5: Can clubfoot deformity recur even after a regular exercise and splint protocols are followed?**

**Answer 5:** Yes, rarely recurrences are observed in children despite regular adherence to post-treatment instructions. However, this recurrence is seen in less than 5% of children. Hence we intend to follow children even after they graduate from splint wear that is after the age of 4 years.

**Question 6: Our child keeps his toes turned inwards and downwards while walking. Is this (Claw-toe) a recurrence of clubfoot?**



**Answer 6:** In young children the ligaments are lax and so the foot arches are not strong. In order to grip the ground, these children curl their toes and turn them slightly in. When the child is not weight bearing, the toes will remain straight. This is not a clubfoot recurrence. It is



observed that these toes gradually turn straight while walking after the age of 3-4 years, once the child develops elasticity in the foot ligaments.

**Question 7 : What happens if we do not treat the recurrent clubfoot deformity immediately? Are there any chances for it to get corrected by itself as the child grows?**

**Answer 7 :** When clubfoot deformity start recurring, it should be treated immediately. Ignoring this will lead to more severe deformity and it can produce structural changes in bones of the foot. A delayed treatment might need more extensive surgical interventions. It is a mistake to assume that the deformity will resolve on its own over time.





## Tibialis Anterior Tendon Transfer

### **Question 1: When is Tibialis Anterior Tendon transfer indicated or prescribed for clubfoot children?**

**Answer 1:** Some children who received corrective plaster treatment for clubfoot may turn the foot inward while walking, even though their clubfoot deformity is completely corrected. This condition is called dynamic supination (Chapter -11, video link). If dynamic supination persists even after modified exercise or plaster re-application, the doctor recommends Tibialis Anterior Tendon Transfer operation.

### **Question 2: Why does dynamic supination deformity arise? Does it indicate the failure of the plaster treatment?**

**Answer 2:** Tibialis Anterior muscle is situated in the front of ankle joint. It lifts the foot while one begins to walk. It is attached to the inner part of the navicular bone, little below the ankle joint. It is believed that in some clubfoot patients, Tibialis Anterior tendon is inserted more medially and lower, this leads to turning in instead of upward lift of foot while a child walks. Another hypothesis is weakness of the muscles which turns foot outward leading to muscles imbalance and dynamic supination. Dynamic supination is not a failure of clubfoot



plaster treatment because every element of clubfoot is completely corrected in children with dynamic supination.

### **Question 3: What is done in Tibialis Anterior Tendon Transfer?**

**Answer 3:** In this operation, the Tibialis Anterior muscle, which is attached to the inner side of foot (on navicular bone), is shifted to the centre of the foot (Lateral cunieform bone). A tunnel is made in the centre of the foot through which the tendon is passed and securely fixed with the bone (Chapter -11, Video Link).

### **Question 4: What precautions we have to take after this operation?**



**Answer 4:** After the Tibialis Anterior Tendon Transfer operation, an above-the-knee plaster cast is applied. This cast is kept on for 6 weeks. Child should not bear weight on the feet while he is in the plaster. Parents have to take care of this. After six weeks, the plaster is removed and

splints are made. These splints are separate and not attached with bar. Splints are worn in operated leg only. It is advisable to continue using this splint for a year.

**Question 5: Does the baby need exercise after this operation?**

**Answer 5:** It is advisable to seek the help of a physiotherapist for a short time after the plaster is removed. Parents are advised to carry out routine stretching exercises at home thereafter.

**Question 6: How long does it take for a child to resume normal walking after this operation?**

**Answer 6:** The foot usually becomes stiff after the plaster is removed. Regular exercise makes it flexible again. Children usually walk with a minor limp for a month and their normal gait pattern resumes thereafter.





## 9

## Parents' Testimonials

**Name:** Mahirajsinh Bhati**Parents:** Mr. Jainendrasinh Bhati, Mrs. Gitanjali Bhati**Age:** 7 Years**Residence:** Jodhpur, Rajasthan**Testimonial:**

My 6 year old baby had clubfoot deformity in both his legs since birth. After a lot of research, we found out about Dr. Maulin Shah in Ahmedabad. We contacted him for his advice. Dr. Maulin Shah reassured us that this can be treated and the child will not have any problem in the future, so there is no need to worry. He told us that sooner we start the treatment, it is better. We started the treatment at OrthoKids clinic from the seventh day of his birth. After 4 to 5 plasters our child underwent a small surgery to loosen the heel cord.

And today I want to tell everyone that my baby can walk



and run like a normal child. We have also forgotten that until 5 to 6 months after the birth of our baby how we, as parents, were worried. Today it seems like a dream. We are grateful to have met a doctor like Maulin Shah who treated the child great care. During the treatment we followed his instructions and no compromise was made during any time or in any treatment and we continued the treatment just as the doctor instructed. Sometimes it happens that once everything starts normalizing, we start to take things lightly but we did not do that. I would suggest to everyone that they should also be vigilant so that 100% result can be achieved. Once again I would like to thank Dr. Maulin Shah for treating my child. Today we are all happily going for a walk together.



**Name:** Aviraj Sharma

**Parents:** Smt. Nisha & Shri. Tapan Sharma

**Age:** 4 months

**Residence:** Ahmedabad



Corrected deformities of Aviraj after 4 plasters.



Photo of Aviraj's father taken before 30 years, when children were advised to wear a caliper.

### Testimonial:

All the members of the family were very happy that day. My daughter-in-law Amiben was about to become a mother for the second time.

Dr. Atulbhai Munshi was contacted for delivery. The doctor who did the antenatal sonography of Amiben in the fifth month, told us that both the legs of the baby were bent in the womb and all the happiness of the family turned into anxiety. I was more sad and worried



because about thirty years ago today the father of this child i.e. my son had also deformity in both his legs at the time of his birth. His treatment had lasted for 18 years. At different intervals we had to undergo the torment of multiple plasters and surgery, the sheer memory of which bring me goose bumps.

The day came when our new baby was born at Munshi Saheb's hospital. As he had explained earlier, both legs of the child had clubfoot deformities.

We contacted Dr. Maulin Bhai for the treatment of our child's feet. He reassured us that there was nothing to worry and everything would be better. On the fifth day after the birth of the baby, Dr. Shah applied plaster to the baby's legs. Systematically, four plasters were done in a month and a half. We were very happy when the fourth plaster was opened. The baby's legs were now straight. We were explained that now she only had to regularly wear boots and bar, and then the treatment would be complete.

We could not believe it because the treatment of the child's father which lasted for 18 years was to be completed here in just four years without any Surgery.

Our whole family is very happy. After the great almighty we are indebted to Dr. Maulin Bhai and we wish for the bright future of Dr. Maulinbhai.



**Name:** Samarth Shroff

**Parents:** Dr. Vishal Shroff, Dr. Mayuri Shroff

**Age:** 2 years 11 months

**Residence:** Ahmedabad



### Testimonial:

During the second trimester antenatal sonography scan we learned about the deformity of our upcoming baby's foot. Our sonologist assured us that treatment was possible. Despite being doctors, it was not easy for us to accept this news. We were concerned whether this deformity could be cured completely, whether our child would be able to walk normally or whether he would develop like a normal baby. On consulting our orthopedic friend he advised us about the outcome and prognosis of clubfoot and assured us that a complete cure was possible. The very next day after the delivery, we visited Dr. Maulin Shah. He examined his foot and assured us that it could be treated. Treatment was started immediately with weekly plasters and minor



surgery under local anesthesia at the end to correct it. Now his foot is completely corrected. We really think that if clubfoot is treated timely, this deformity can be cured in early childhood. We are really happy that Samarth is better now and we are really thankful for the treatment provided by Dr. Maulin Shah and for guiding us in this difficult time.



**Name:** Kushal Singh

**Parents :** Shri Kamal Singh - Smt. Sarika Singh

**Age:** 4 years and 3 months

**Residence:** Mehsana



### Testimonial:

My son Kushal Singh was born with a defect called Clubfoot and was diagnosed in the fourth month of pregnancy during antenatal sonography. We were advised by the sonologist that the baby would be treated after birth and therefore there was no need to worry. He was born in a hospital in Gandhinagar and we were referred to an orthopedic doctor by our pediatrician. That doctor advised to start treatment with plaster 21 days after the birth. We started the treatment as per his advice. After 21 days, the first round of plaster was done for 15 days and then it was removed. Four more plasters were similarly applied, but to our disappointment there was no improvement. My son was in great pain. We too were very much worried as parents. We met our paediatrician again and he told us to consult Dr. Maulin Shah as he is a specialist in treating congenital defects like



clubfoot.

It was in August 2016, that we first consulted Dr. Maulin Shah and after that have followed his advice only. Here we were explained about the Ponseti method of treatment and we religiously followed all the treatment protocols of Dr. Maulin Shah. After 4 to 5 rounds of plaster, a clear difference was visible in my son's legs. A tenotomy was then performed on both legs. After that John Mitchell Splint was made at Bonny Orthotech, Ahmedabad on the advice of Dr. Shah. He told us that he had to wear the splint till the age of 4 years. But my son refused to wear a splint after three years. We tried many alternatives but they didn't work. His compliance to the splint was not proper. In fact, my son is very active and walks and runs without any signs of foot defects. After the age of 4 years, Dr. Maulin Shah advised us to have an operation because my son had a tendency to walk with his feet slightly elevated from the ground which could result in clubfoot recurrence and we agreed. Bilateral TA Lengthening and Posterior Soft Tissue Release was performed on 21.06.2020 and the desired result was achieved by the doctor. Now he is walking and doing his daily work effortlessly. We are very grateful to Dr. Maulin Shah and Orthokids Clinic staff for the good results achieved by Kushal. Now, Kushal climbs even tall trees very easily. Maulin sir calls him *"Little Tarzan"*.





**Name:** Mohammad Zafir

**Parents:** Mr. Irfan Sheikh - Mrs. Farah Sheikh,

**Age:** 5 years 7 months

**Residence:** Ahmedabad



### Testimonial:

I was shocked to learn during my wife's 16<sup>th</sup> week sonography that my baby had deformities in his legs. I was really worried until I met Dr. Maulin Shah, a clubfoot expert in my city. He dispelled many of our doubts about Clubfoot and assured us that there was no need to worry. We were explained that our baby's legs can be corrected, without any major surgery by Ponseti method. We started my baby's treatment when he was only two days



old and then he faced many challenges in treatment. We followed all the advice given by sir and also followed the instructions on “exercise and splinting”. Mohammad Zafir's legs were corrected after 1.5 months of plaster treatment. But some children with clubfoot may have "dynamic supination" in their foot, with the toes turning inwards as the child walks. This deformity also occurred in our child. We were again worried about having surgery on our child's legs but Dr. Maulin sir briefed us on everything related to the operation. About 1.5 years ago, 'Tendon Transfer' operation was performed on our son by him.

Mohammed Zafir is now just like any other normal child and he can do all the activities. One can hardly say that he was ever born with Clubfoot.

My experience at the Orthopedics Clinic is that the doctors and staff are very supportive. I confidently recommend Orthokids to any relatives for the treatment of pediatric orthopaedic conditions.



**Name:** Jainil Mehta

**Parents:** Shri Deepak Mehta - Smt. Bhavika Mehta

**Age:** 2.3 years

**Residence:** Jamnagar, Gujarat.



### Testimonial:

The birth of our first child was a great blessing for us. But despite the joy we were in shock and extreme pain as our son was born with deformity in both feet. We were very concerned as no one in our family had any such deformity or genetic disorder before. After consulting a pediatrician, he suggested that we seek treatment at OrthoKids clinic. We took our 4-day-old baby to the OrthoKids clinic. There, after talking to Dr. Maulin Shah we started his treatment. After 1.5 months of plaster treatment, regular exercise splint treatment was continued. After regular check-ups and treatment under his guidance, today our child can walk, play and run like a normal child. He is still undergoing treatment and we hope the best for him. It is very difficult to see your



newborn baby in plaster and wearing splints 24x7. My only advice to all other parents is to strictly follow all the instructions given by the doctor and to do every exercise shown. Have positivity and have faith in God. I wish all the children the best.

Thank you.



**Name:** Keya Gohel

**Parents:** Dr. Naresh Gohel, Smt. Deepa Gohel

**Age:** 13 Years

**Residence:** Bhavnagar



Keya is a trained dancer today. She has also authored a book.



**Testimonial:**

Dr. Maulinbhai's cooperation in our daughter's clubfoot treatment cannot be described in words alone. He has helped us a lot during each stage of treatment.

1) At the time of the diagnosis of Club Foot made ante-natally, with immediate reassurance that everything will become perfectly normal, without any major surgery.

2) On the second day of birth, Dr. Maulinbhai specially came to Bhavnagar from Ahmedabad and immediately applied plaster to my daughter, gave excellent treatment to the baby and thereby contributing to her and our health.

3) Then after applying a series of 5 plasters every 10-15 days and after about 3 months both the legs of our daughter became perfectly normal. During this time Dr. Maulinbhai took constant updates from us regarding our daughter.

4) We remember that Dr. Maulinbhai specially came to Bhavnagar and applied 3 plasters and invariably checked on her before leaving back for Ahmedabad in the evening.

5) He also gave us details about size of splint, its design,



its soft cushioning, and its timely change.

6) He stressed the importance of regular exercise.

7) Dr. Maulinbhai made our Keya's club foot problem easy and completely normal for us.

8) We are very satisfied with the simple - accurate - complete treatment that we received and we felt that we are grateful we met a skilled and knowledgeable specialist doctor like him. Dr. Maulinbhai has an extraordinary expertise in the treatment of club feet. At the age of 13, Keya has normal legs and does all kinds of activities. It includes Bharatnatyam, Table Tennis, Cycling, Long jump, Running etc.



10

## Clubfoot Race - 2015







Gold Medal in Karate.

Gold Medal in Sprint.

### Sportsmen of Orthokids

The first week of June is celebrated as the "World Clubfoot" week. 3rd June 1914, is the birth date of Dr. Ponseti. On this date in 2015, Clubfoot Race was organized by Orthokids Clinic. About 200 children, born with clubfoot and treated at OrthoKids, participated in



this clubfoot race. The children's race was held for different age groups. Besides that, many other activities were organized, such as fashion show, dance competition and children's entertainment events. A discussion and Question-Answer session was also organized at the end of the program to increase the awareness of parents and media. Actually, it seemed more like a school annual festival than a clubfoot race. At OrthoKids clinic, we organize activities of this kind every year to build the confidence of the parents and their children born with clubfoot.



## YouTube Links of Important Clubfoot Treatment Videos



1.  
Effective Clubfoot Care :  
Dr. Maulin Shah's Television  
Interview  
<https://youtu.be/9JI7c5VKAd8>



2.  
Tenotomy at the end of  
Ponseti plaster treatment  
<https://youtu.be/c-kW0exV1Us>



3.  
Exercises to be carried out after  
Ponseti plaster treatment.  
<https://youtu.be/DSDOZMGVAzA>



4.  
Tibialis Anterior Tendon  
Transfer operation  
<https://youtu.be/5sOhJsiD2Kg>



5.  
Orthokids Clubfoot  
Treatment -Playlist.  
<https://bit.ly/2GTyJPm>





" I hope that this information booklet will provide all the answers that the parents have been looking for and help them through their clubfoot treatment journey. At the end of this book, we have included experiences of some of the parents. I am sure that after reading these feedbacks, you will become more confident regarding this treatment....."

- Dr. Maulin Shah  
Orthokids Clinic

## ORTHO Kids CLINIC

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